

# Confessions of a converted lecturer



Institute for Pedagogy in the Liberal Arts 2013  
Oxford College of Emory University  
Oxford, GA, 14 May 2013





# Confessions of a converted lecturer



**@eric\_mazur**

Institute for Pedagogy in the Liberal Arts 2013  
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- no ON/OFF button
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unique ID on back of clicker



**Think of something you are good at**

**EDUCACION**



**Think of something you are good at**

***How did you become good at this?***

**EDUCACION**



**Became good at it by:**

- 1. trial and error**
- 2. lectures**
- 3. practicing**
- 4. apprenticeship**
- 5. other**



















1 education

2 PI

3 test






1 education

2 PI

3 test





**What happens  
in a lecture?**



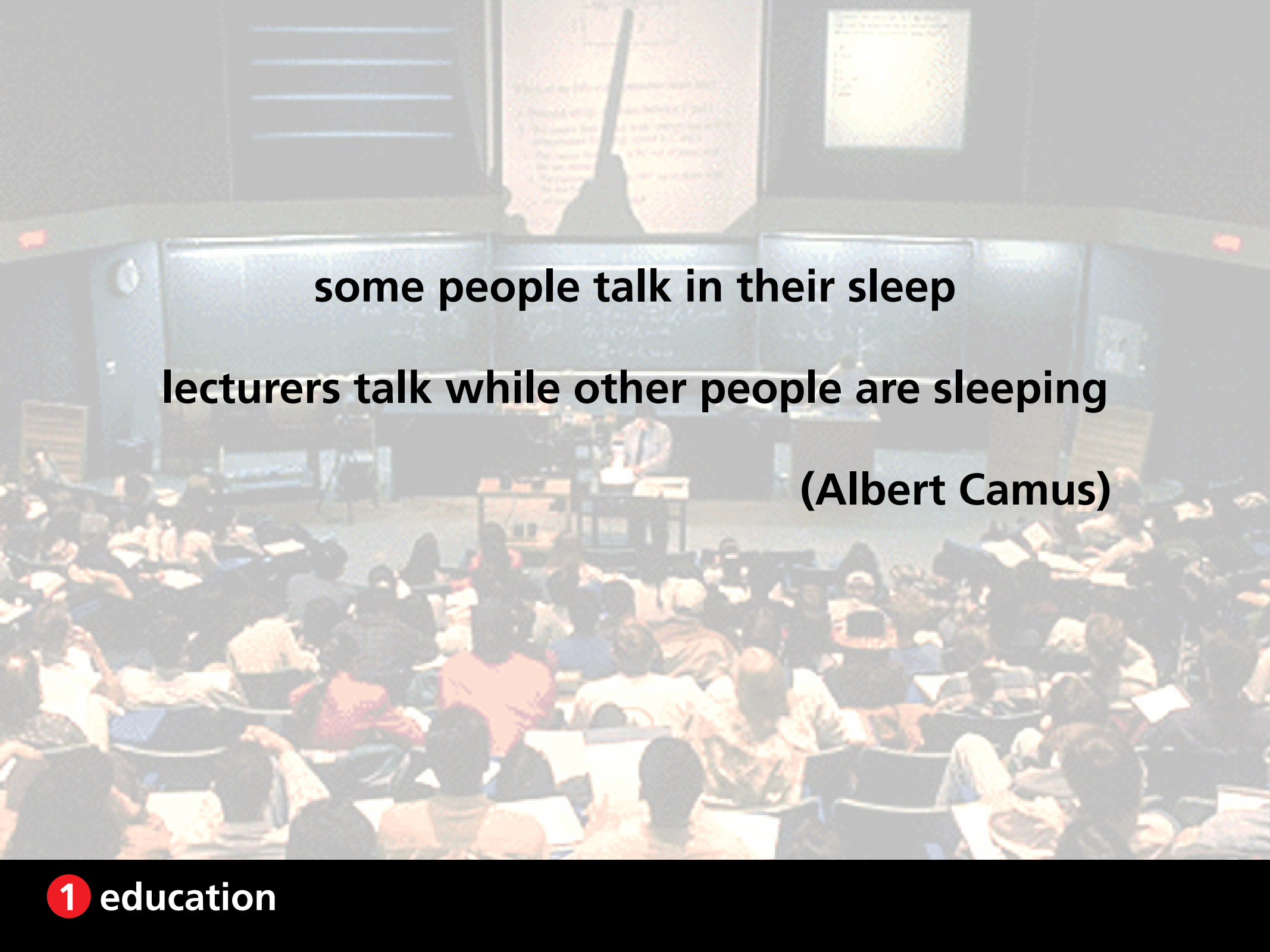




A wide-angle photograph of a large lecture hall. In the foreground and middle ground, many students are seated in rows, facing the front of the room. Most of them appear to be asleep, with their heads resting on their desks or closed. The room has a curved wall at the front with several large projection screens. One screen in the center shows a list of bullet points, while the others show less legible content. A lecturer is standing at a podium in the center of the front stage, facing the audience. The overall atmosphere is one of a lecture where many students are disengaged or tired.

**some people talk in their sleep**



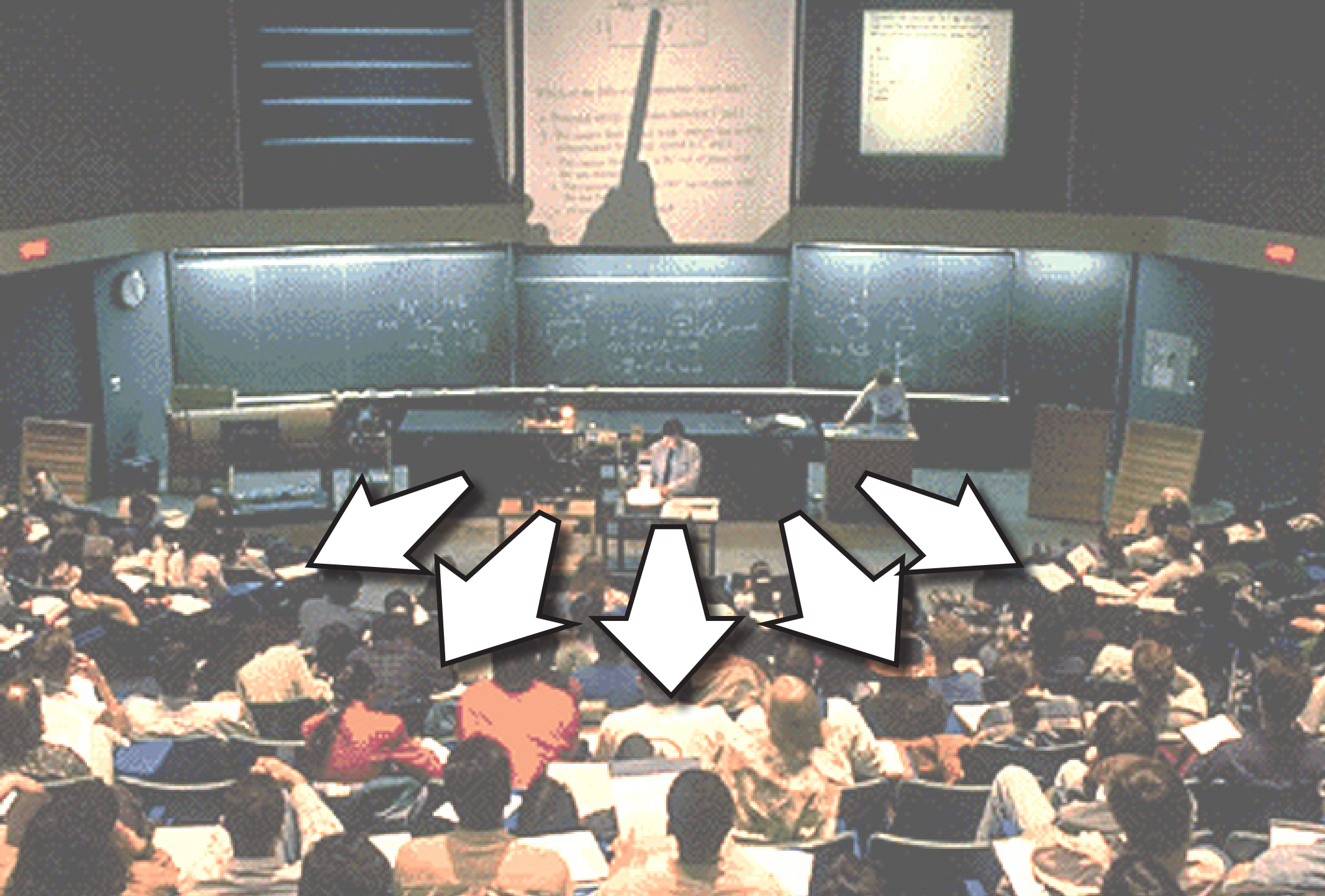
A large lecture hall filled with students. In the foreground, many students are sleeping with their heads down. In the background, a lecturer is standing at a podium, addressing the class. The room has a curved wall and a large screen displaying text.

**some people talk in their sleep**  
**lecturers talk while other people are sleeping**  
**(Albert Camus)**









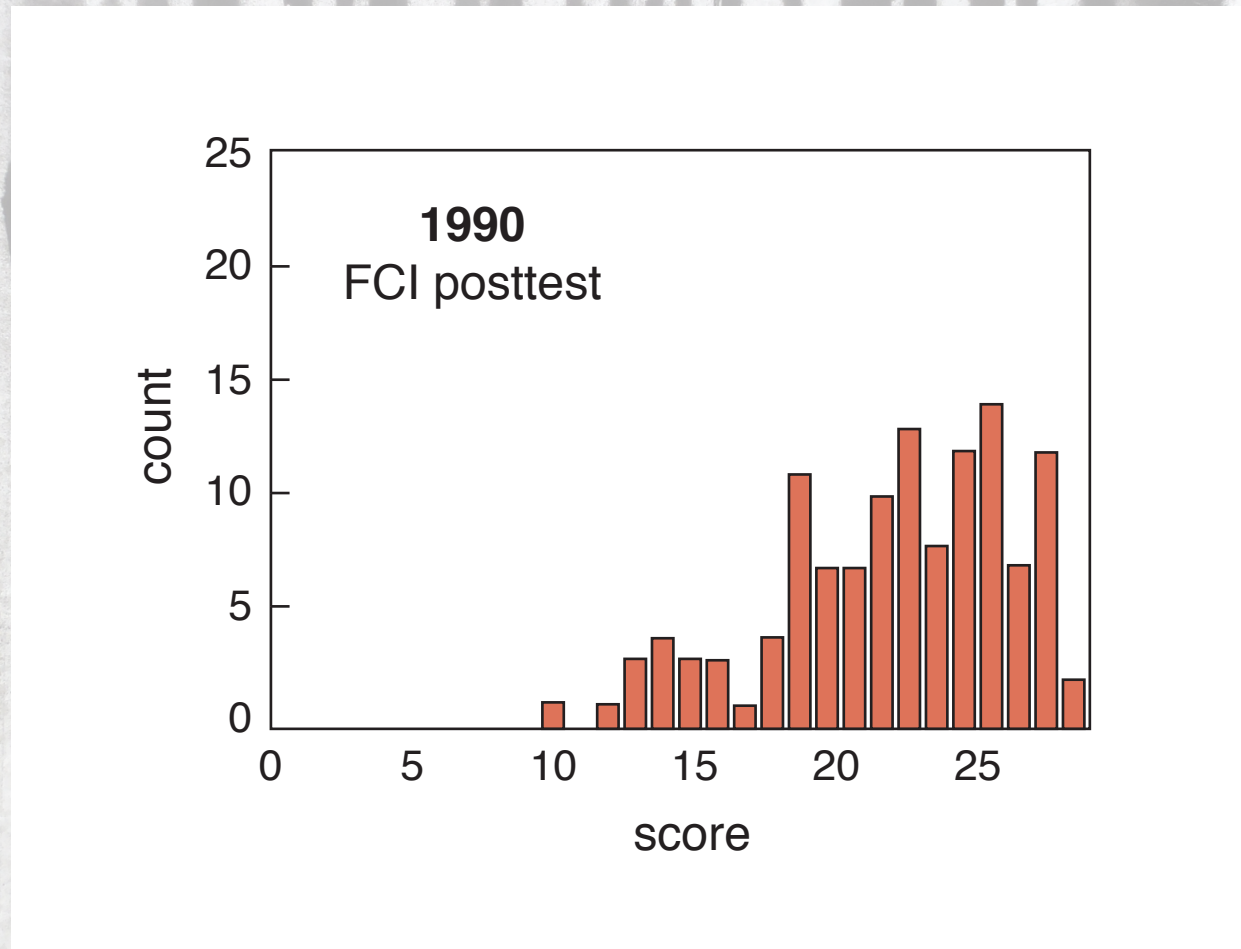


The result?

EDUCACION

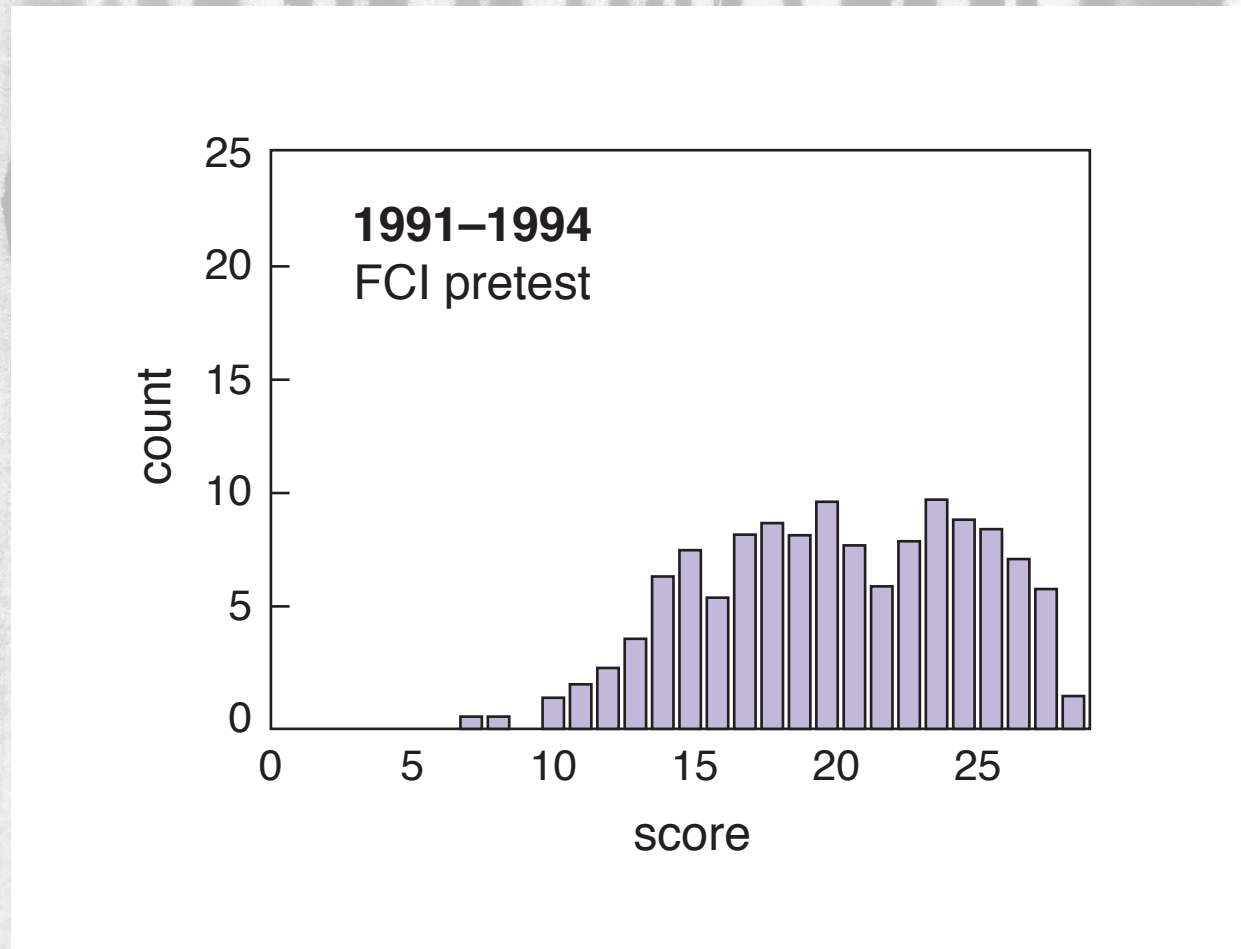


education is not just information transfer



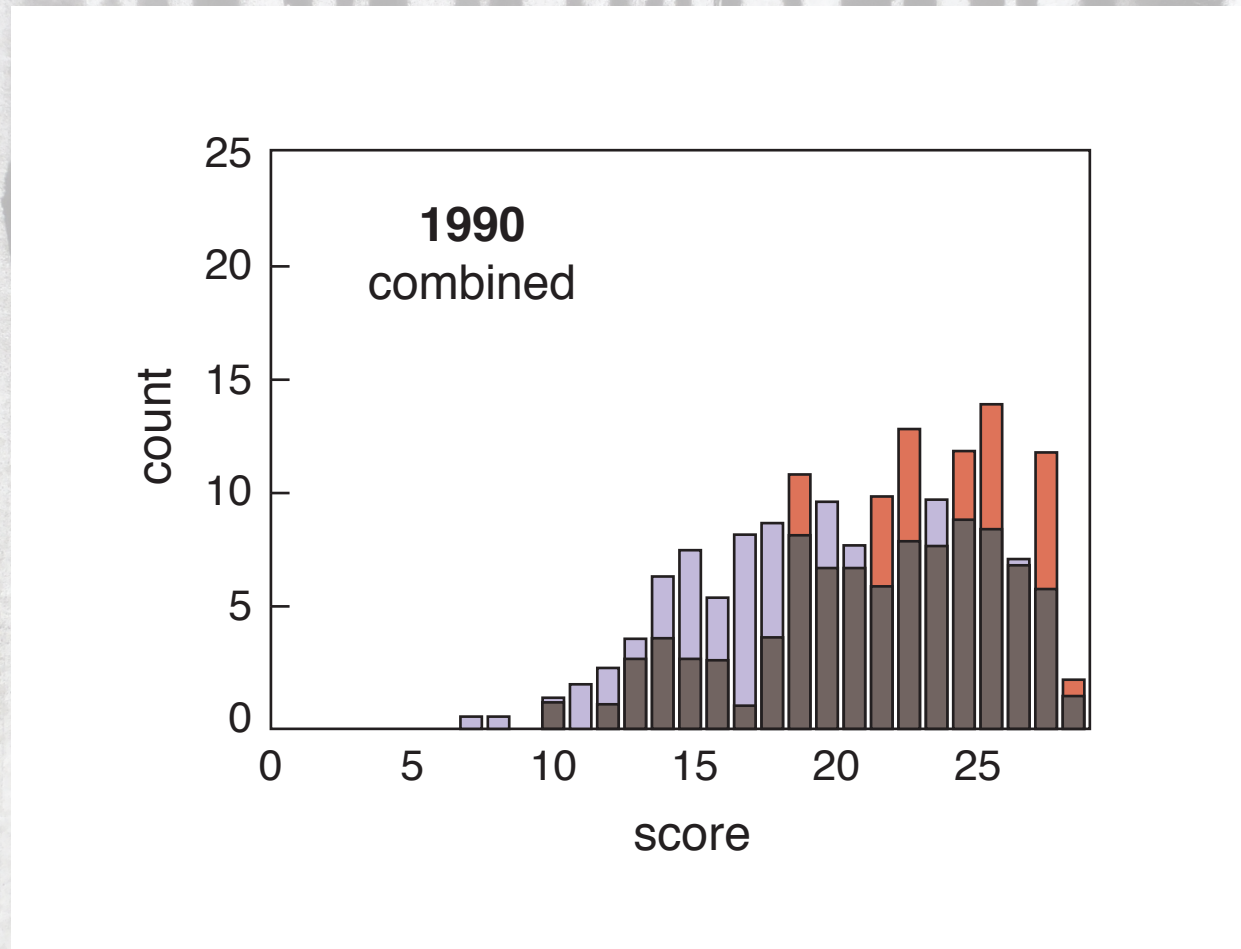


# education is not just information transfer

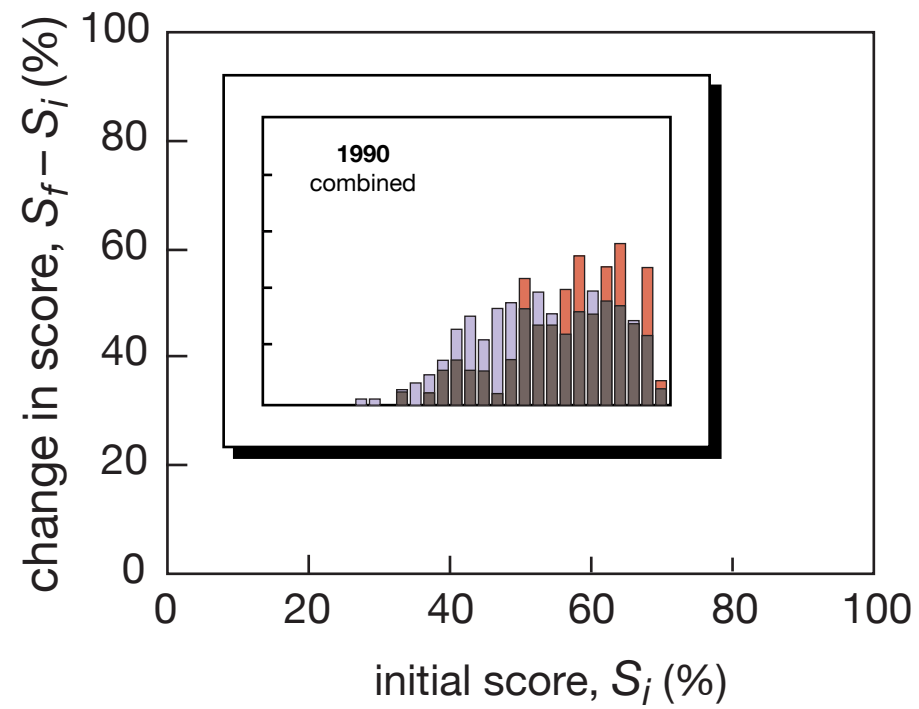




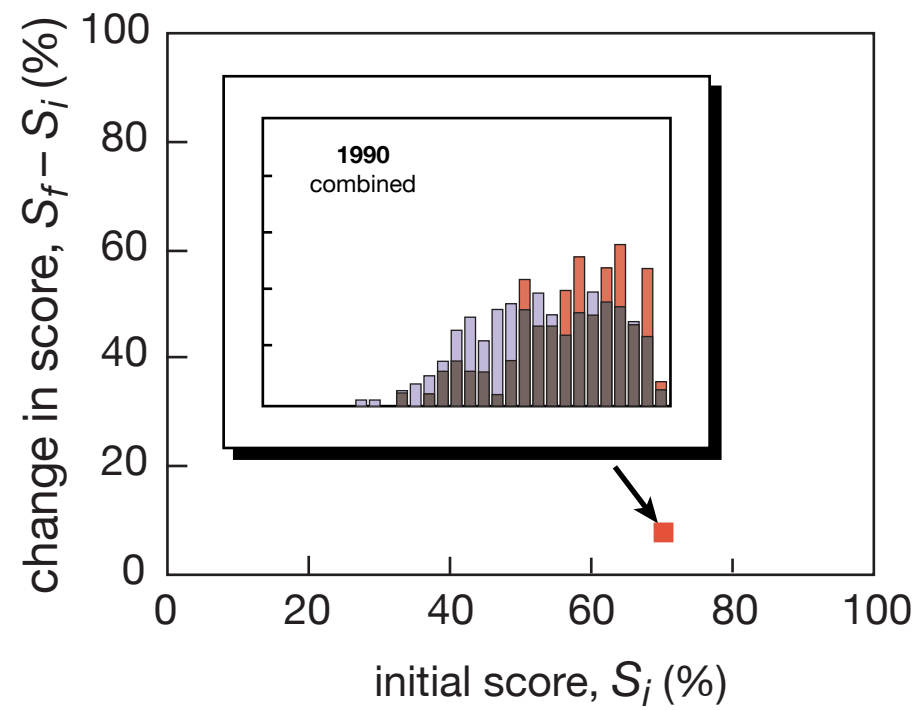
# education is not just information transfer



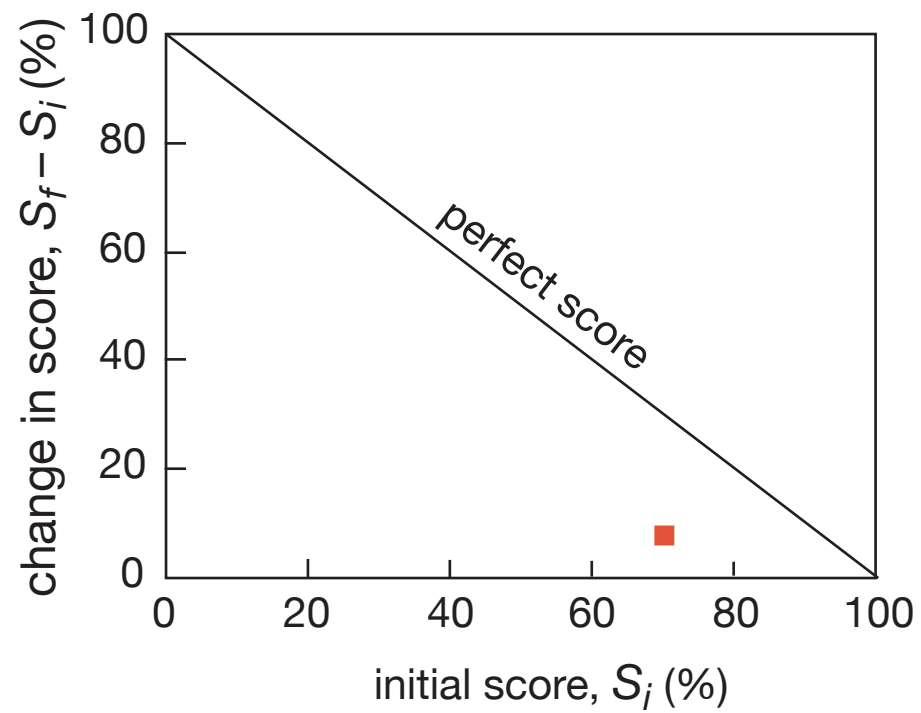




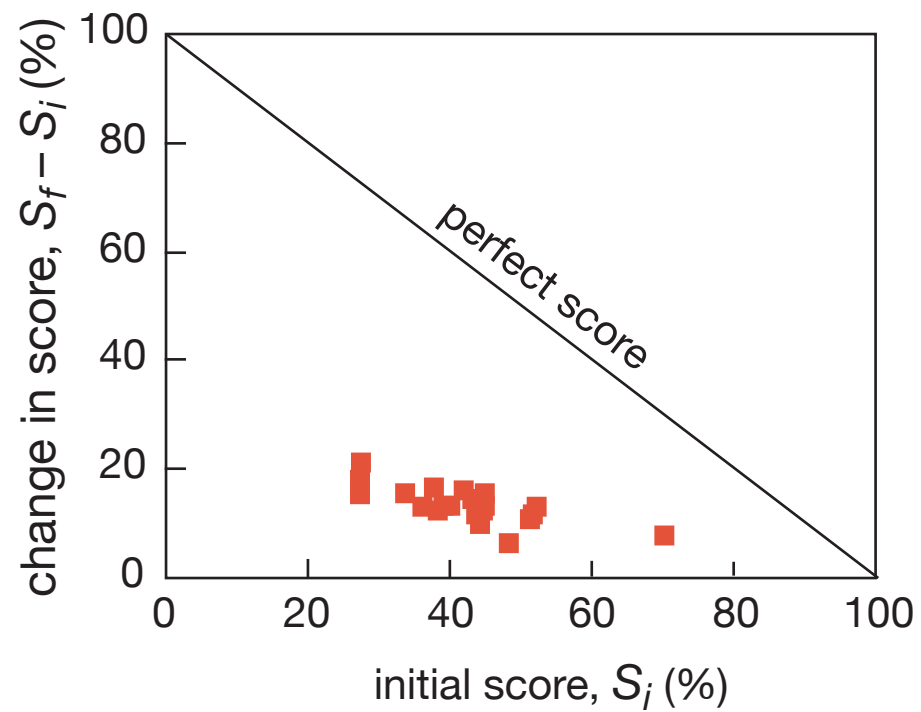








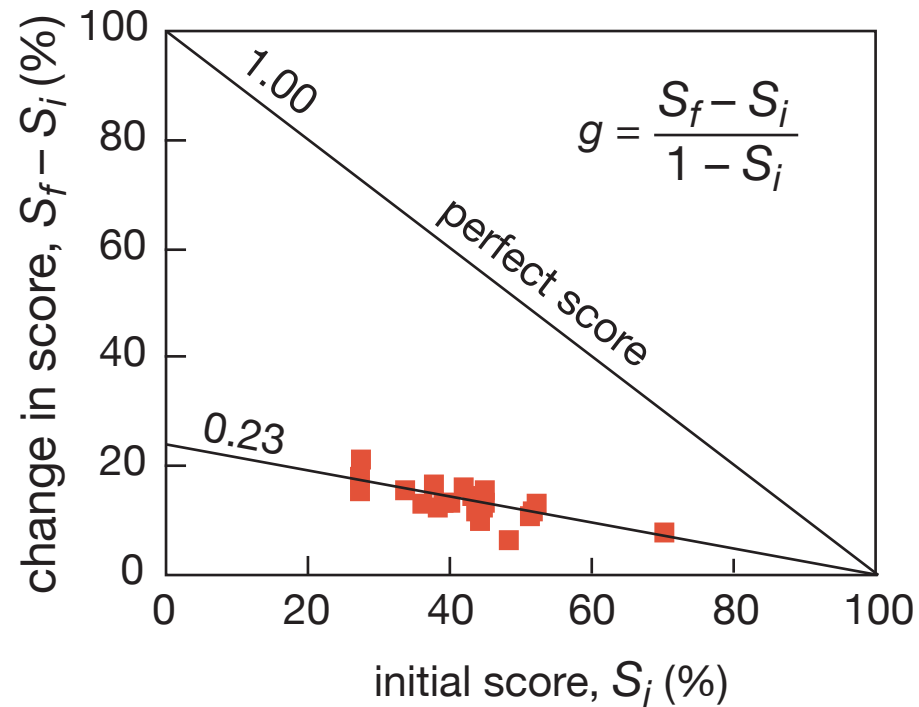




R.R. Hake, *Am. J. Phys.* 66, 64 (1998)



only one quarter of maximum gain realized



R.R. Hake, *Am. J. Phys.* 66, 64 (1998)



**not transfer but assimilation of information is key**









## 1. transfer of information





**1. transfer of information**

**2. assimilation of that information**





**1. transfer of information (in class)**

**2. assimilation of that information**





1. transfer of information (in class)

2. assimilation of that information (out of class)





**Should focus  
on THIS!**

1. transfer of information (in class)

2. assimilation of that information (out of class)



- 
- 1. transfer of information (in class)**
  - 2. assimilation of that information (out of class)**



- 
1. transfer of information (out of class)
  2. assimilation of that information (in class)





# Peer

1. transfer of information (out of class)

2. assimilation of that information (in class)



question

1 education

2 PI



**question**



**think**



**question**



**think**



**poll**



**question**



**think**



**poll**



**discuss**



**question**



**think**



**poll**



**discuss**



**repoll**



**question**



**think**



**poll**



**discuss**



**repoll**



**explain**











**1** education

**2** PI

Let's try it!

QUESTION

think

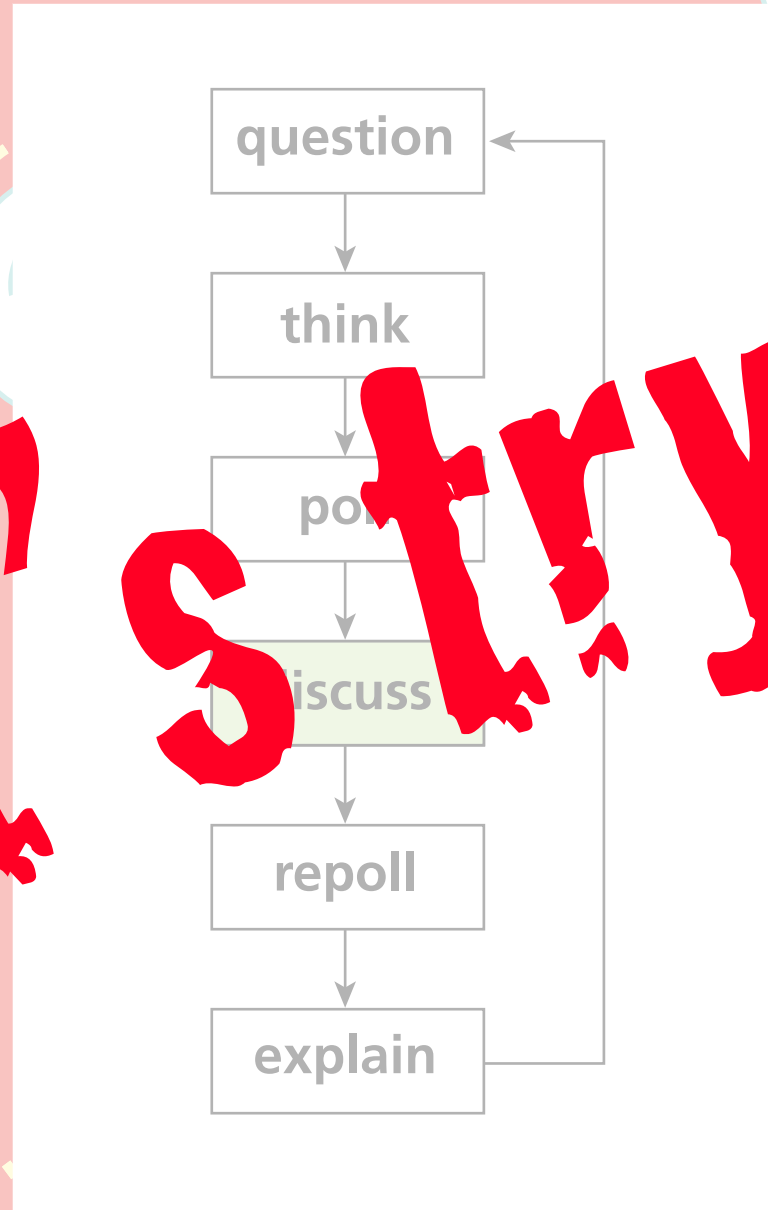
poll

discuss

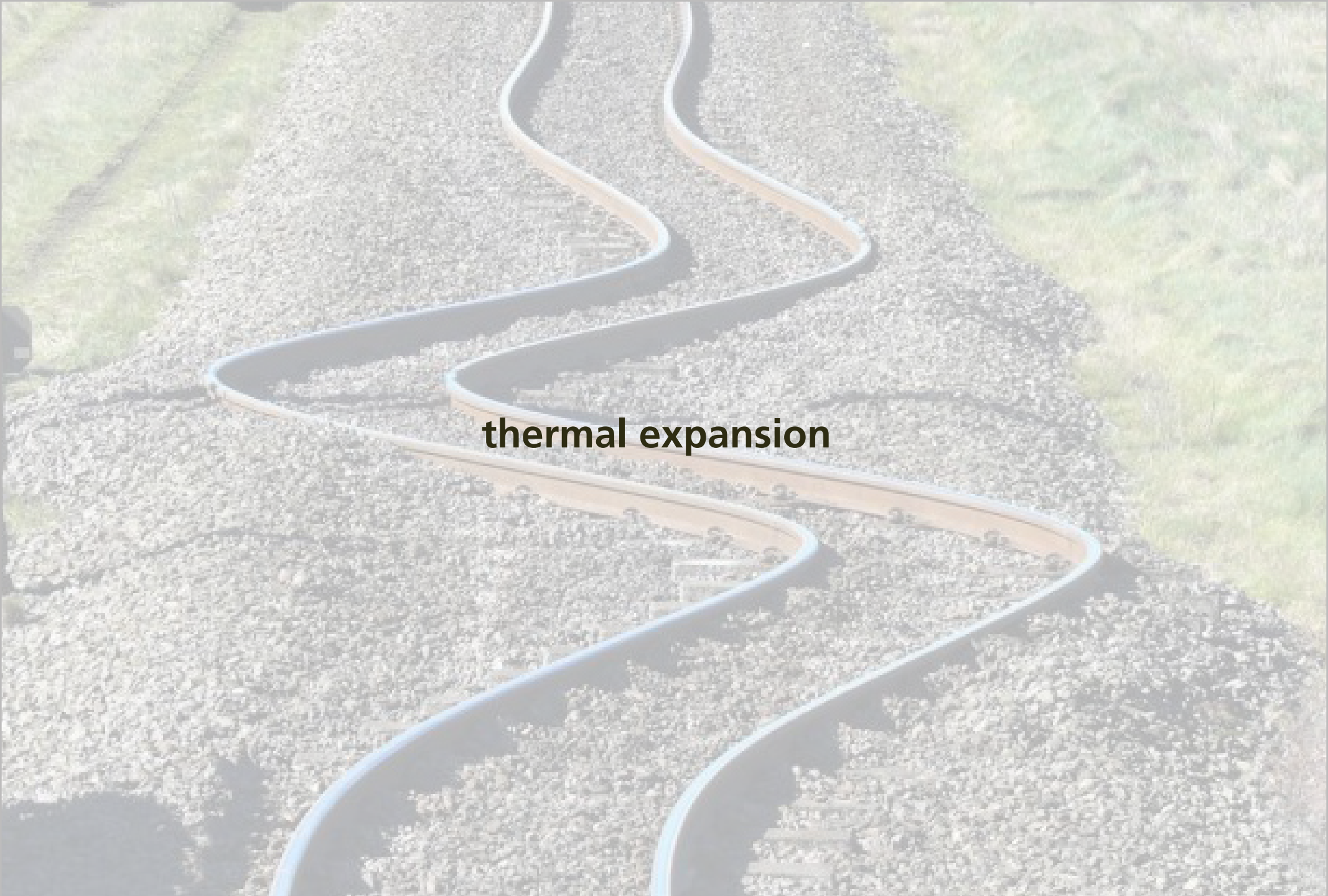
repoll

explain

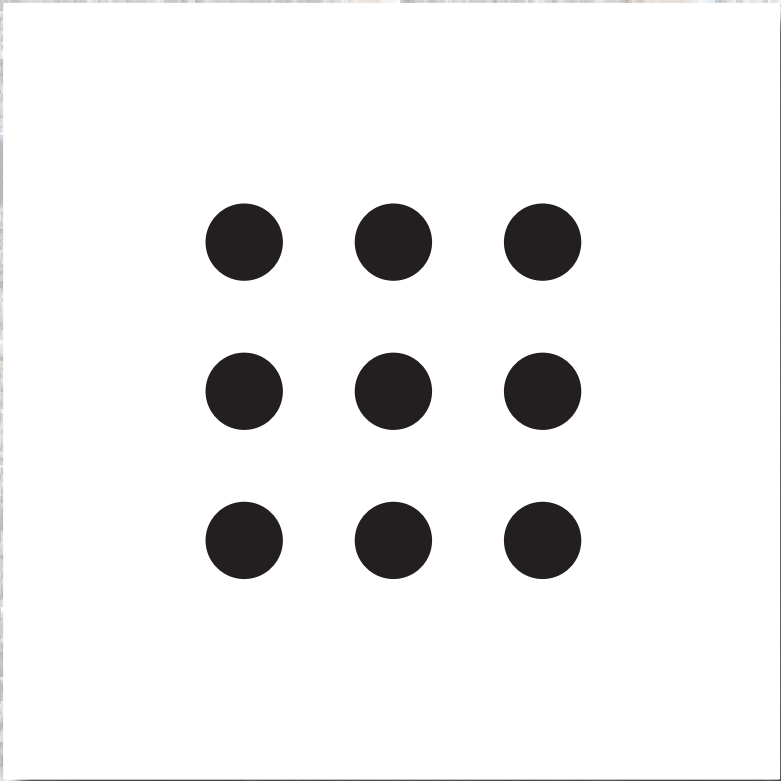
ACTION



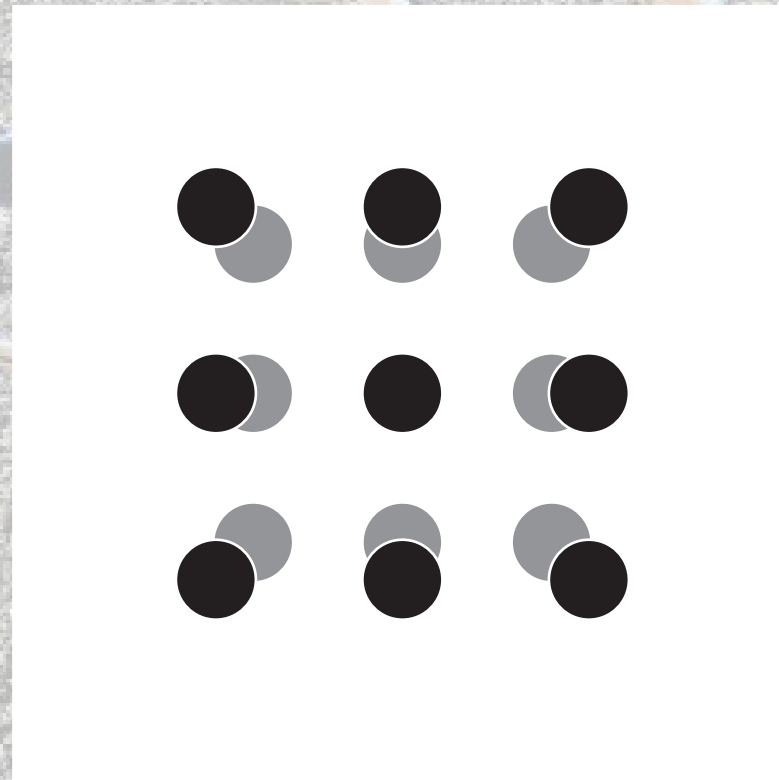


An aerial photograph of a railway track. The track is composed of two parallel steel rails, which are highlighted with a blue-to-orange gradient. The rails are laid on a bed of dark grey gravel. The track is not straight but follows a wavy, S-shaped path across the landscape. The surrounding area is covered in green grass. The text "thermal expansion" is written in a bold, black, sans-serif font, centered over the middle of the track.

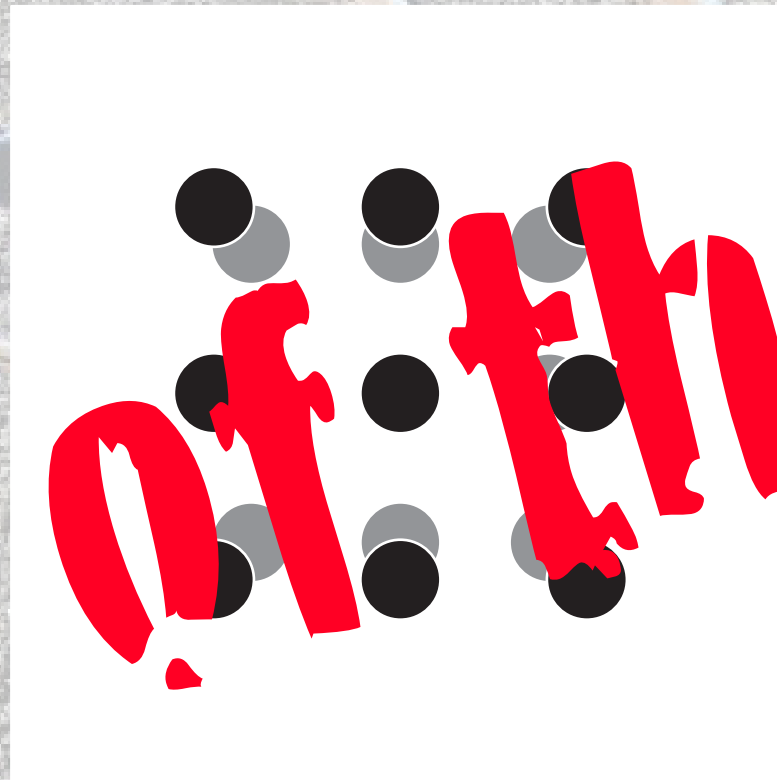
**thermal expansion**







**all of them**



**1** education

**2** PI



**Consider a rectangular metal plate  
with a circular hole in it.**



**Consider a rectangular metal plate with a circular hole in it.**

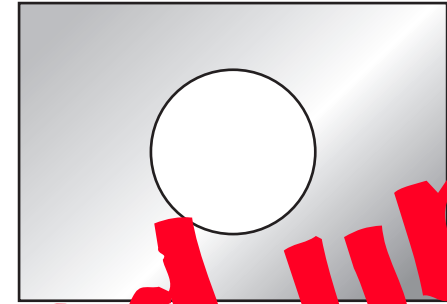


**When the plate is uniformly heated, the diameter of the hole**

- 1. increases.**
- 2. stays the same.**
- 3. decreases.**



Consider a rectangular metal plate with a circular hole in it.



When the plate is uniformly heated, the diameter of the hole

1. increases.
2. stays the same.
3. decreases.

**you got all fired up!**

**Consider a rectangular metal plate with a circular hole in it.**



**When the plate is uniformly heated, the diameter of the hole**

- 1. increases.**
- 2. stays the same.**
- 3. decreases.**



**Before I tell you the answer...**

**Before I tell you the answer, let's analyze what happened.**



**Before I tell you the answer, let's analyze what happened.**

**You...**

**Before I tell you the answer, let's analyze what happened.**

**You...**

**1. made a commitment**



**Before I tell you the answer, let's analyze what happened.**

**You...**

- 1. made a commitment**
- 2. externalized your answer**

**Before I tell you the answer, let's analyze what happened.**

**You...**

- 1. made a commitment**
- 2. externalized your answer**
- 3. moved from the answer/fact to reasoning**



**Before I tell you the answer, let's analyze what happened.**

**You...**

- 1. made a commitment**
- 2. externalized your answer**
- 3. moved from the answer/fact to reasoning**
- 4. became emotionally invested in the learning process**

**Consider a rectangular metal plate with a circular hole in it.**



**When the plate is uniformly heated, the diameter of the hole**

- 1. increases.**
- 2. stays the same.**
- 3. decreases.**



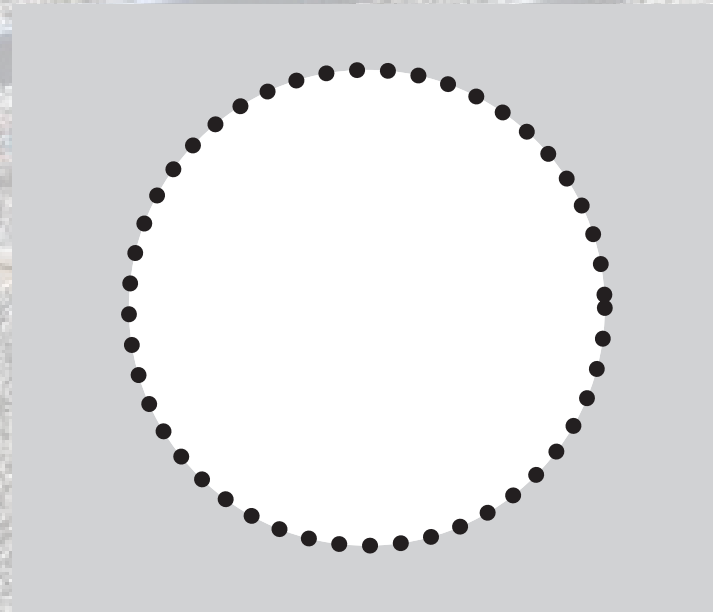
**Consider a rectangular metal plate with a circular hole in it.**



**When the plate is uniformly heated, the diameter of the hole**

- 1. increases. ✓**
- 2. stays the same.
- 3. decreases.

consider atoms at rim of hole



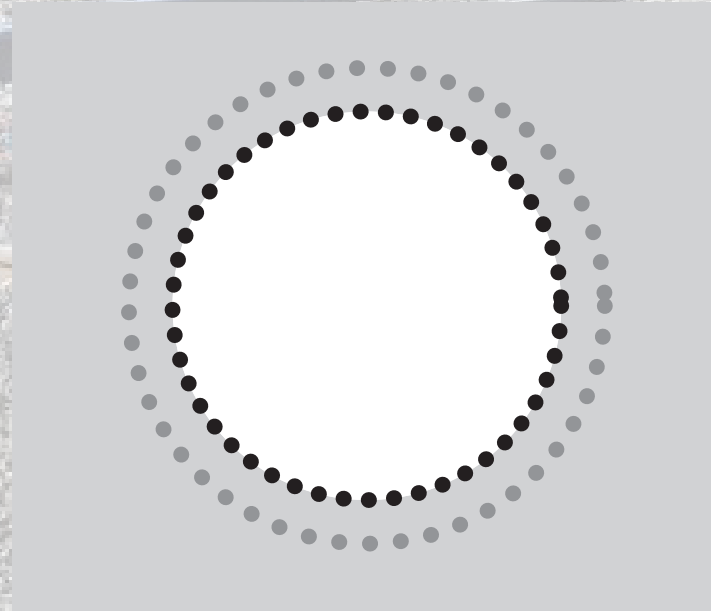
1 education

2 PI

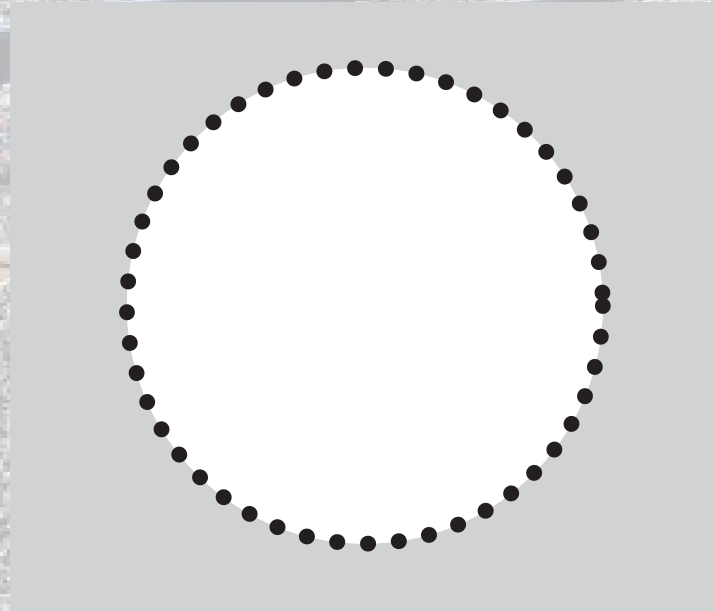
3 test



consider atoms at rim of hole



consider atoms at rim of hole



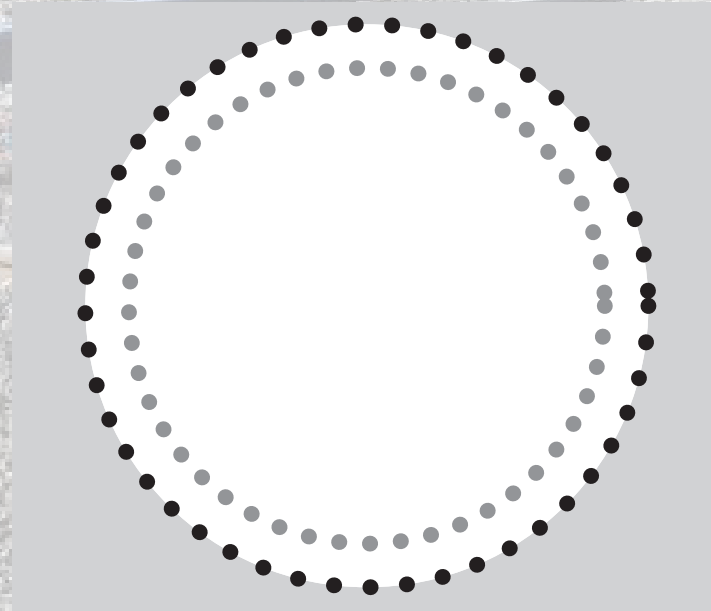
1 education

2 PI

3 test



consider atoms at rim of hole



consider atoms at rim of hole

you won't forget this

1 education

2 PI

3 test



# Peer

**back to PI**

# INSTRUCTION

1 education

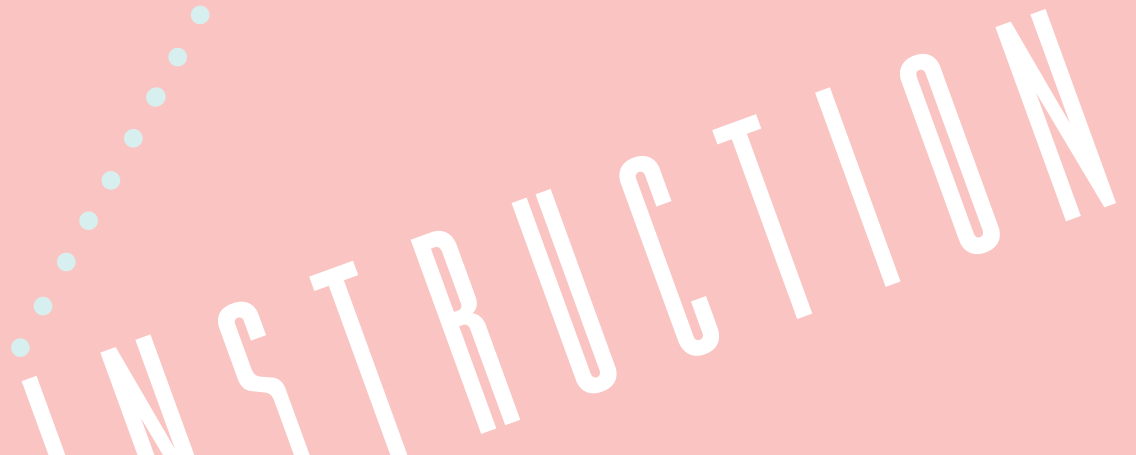
2 PI

3 test



Peer

is it any good?



INSTRUCTION

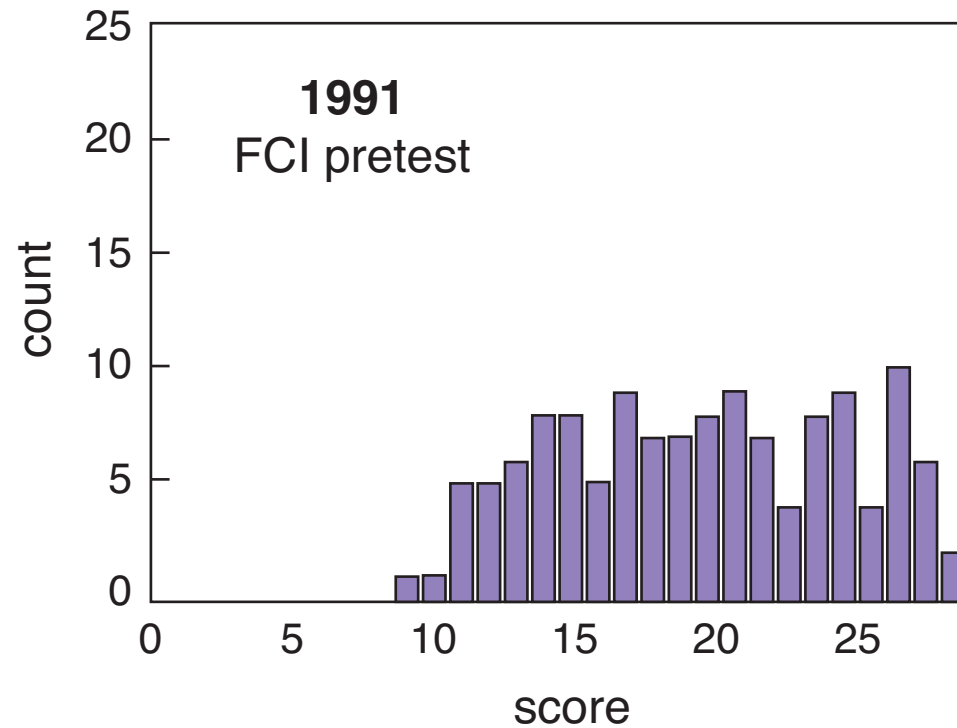
1 education

2 PI

3 test



## first year of implementing PI

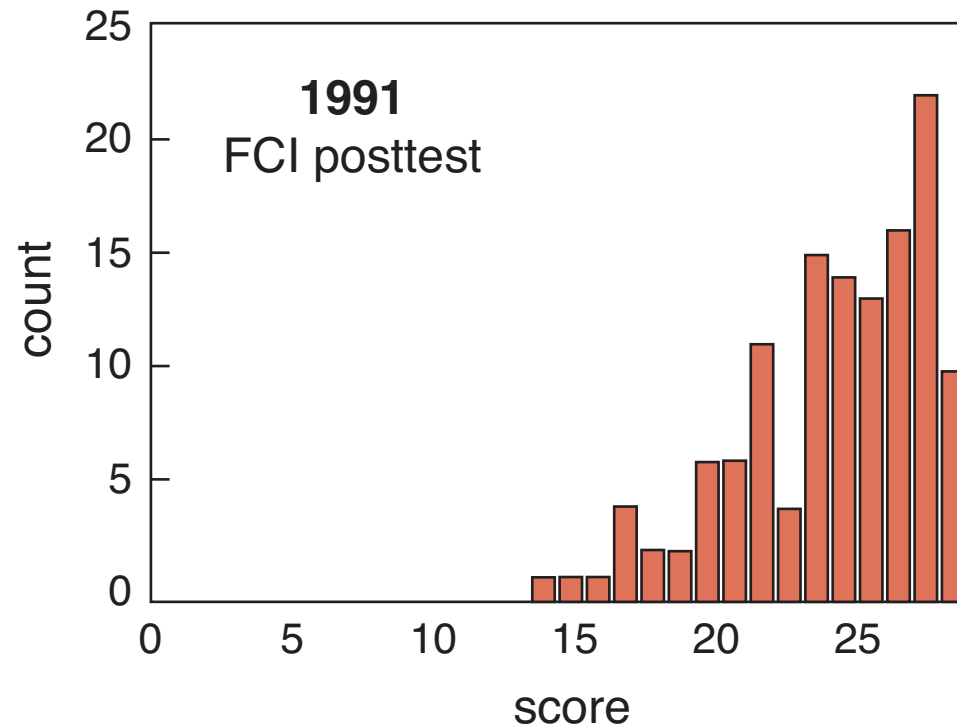


1 education

2 PI

3 test

## first year of implementing PI



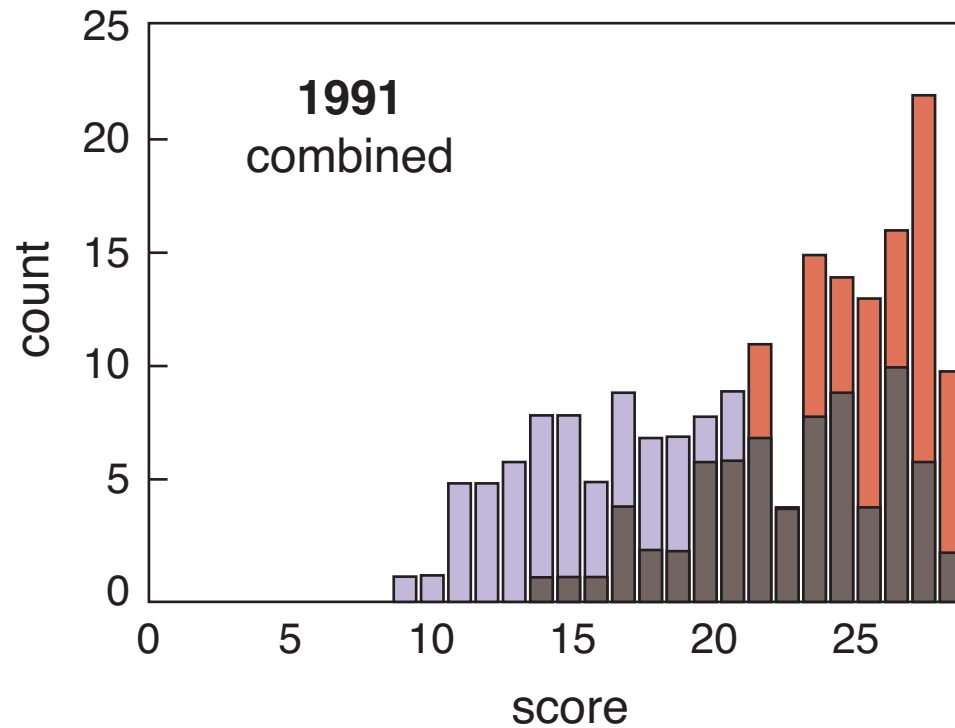
1 education

2 PI

3 test



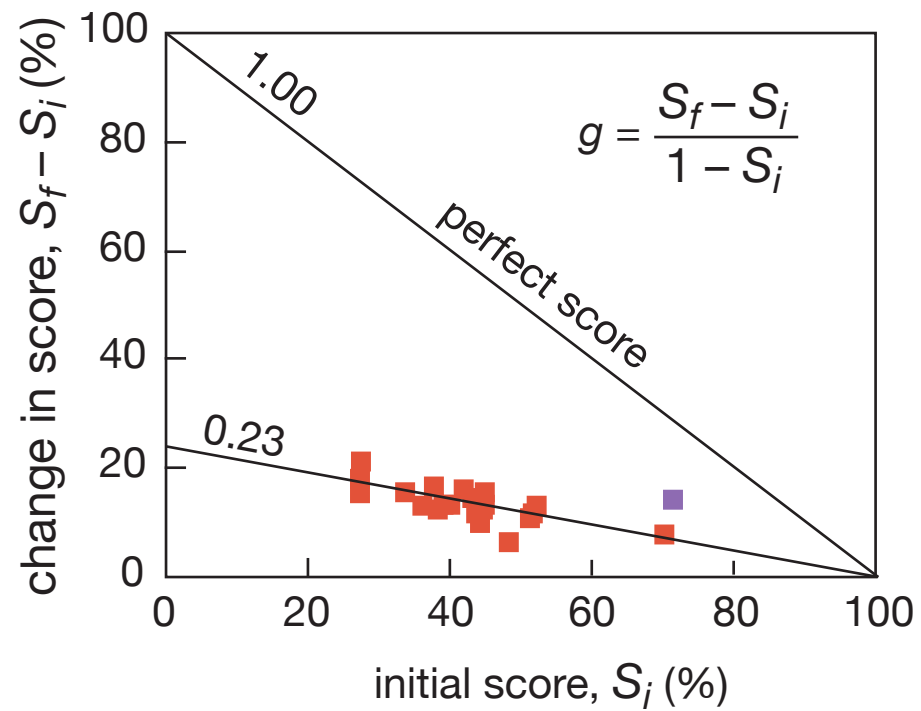
## first year of implementing PI



1 education

2 PI

3 test

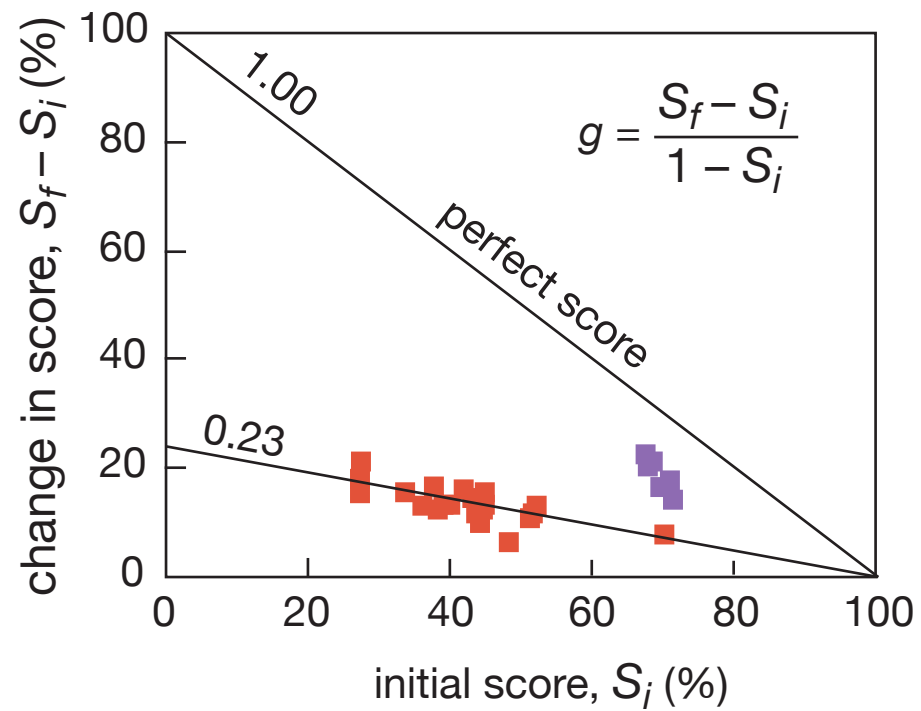


1 education

2 PI

3 test

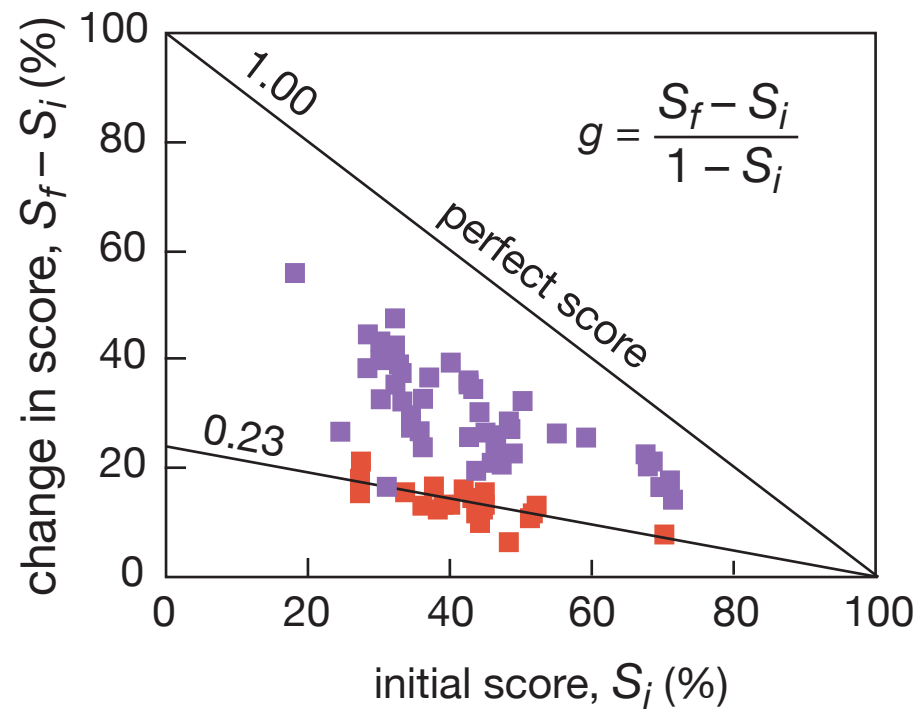




1 education

2 PI

3 test



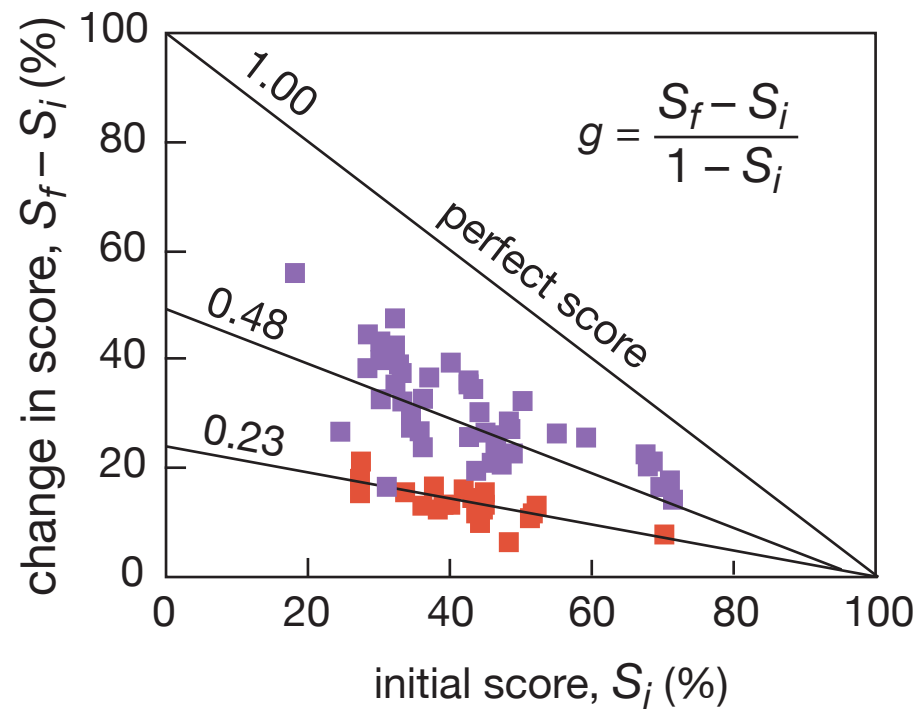
R.R. Hake, *Am. J. Phys.* 66, 64 (1998)

1 education

2 PI

3 test





R.R. Hake, *Am. J. Phys.* 66, 64 (1998)

1 education

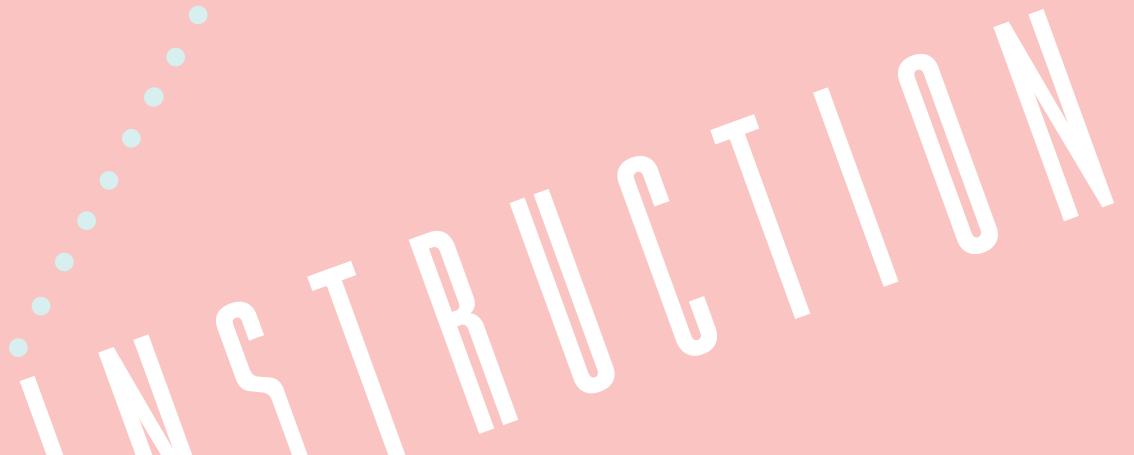
2 PI

3 test



# Peer

**what about problem solving?**

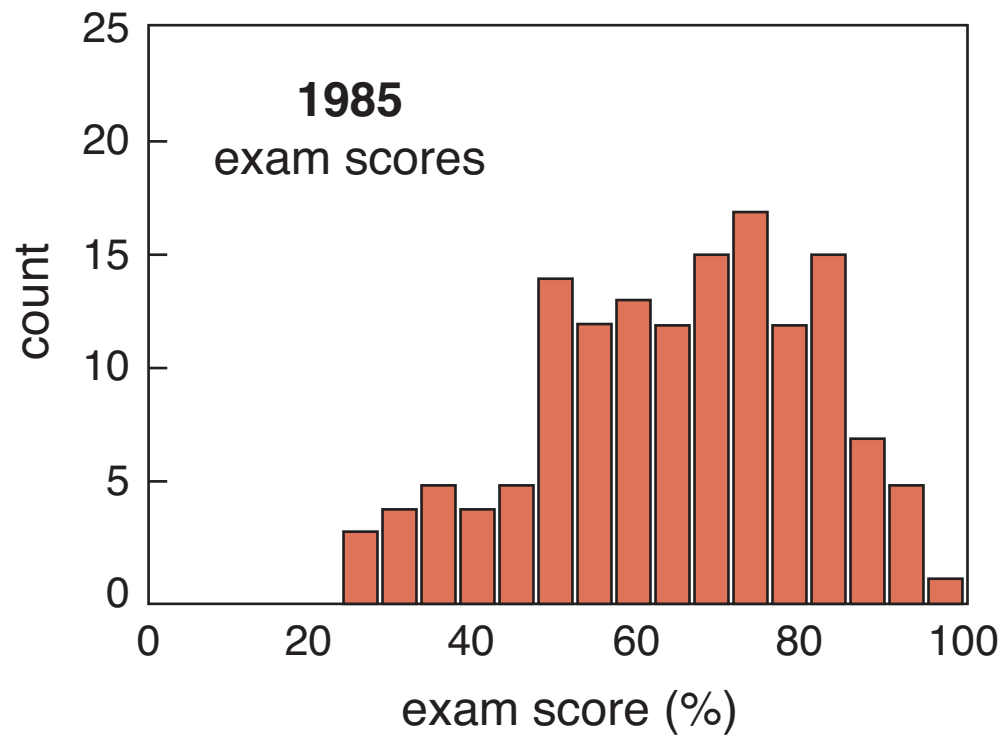


# INSTRUCTION

**1** education

**2** PI

**3** test

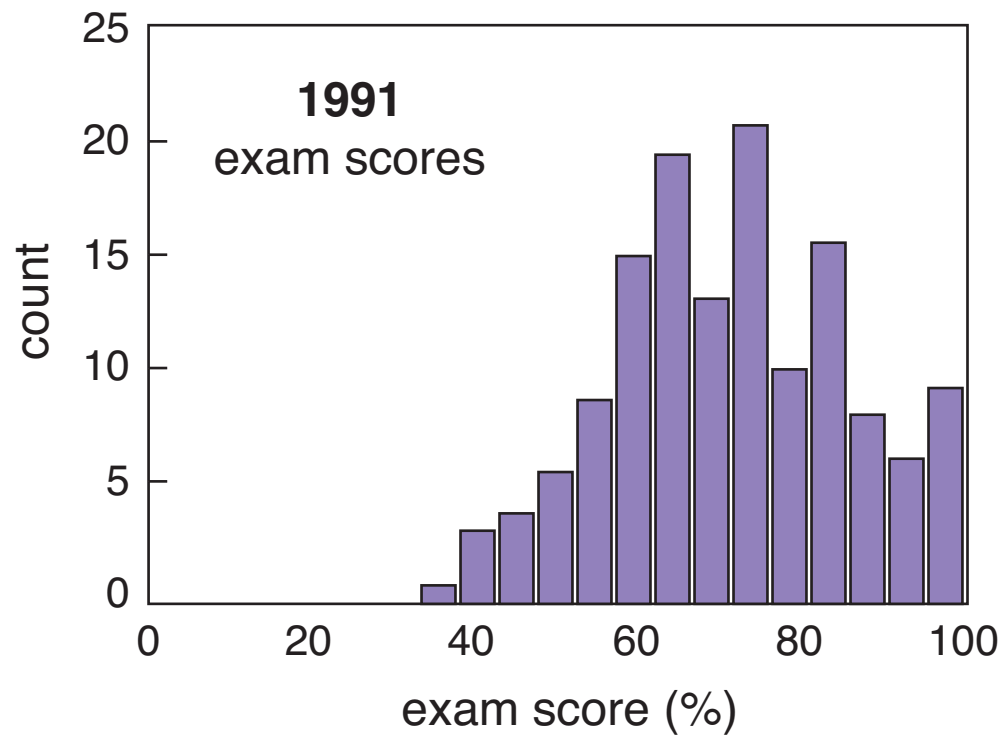


1 education

2 PI

3 test

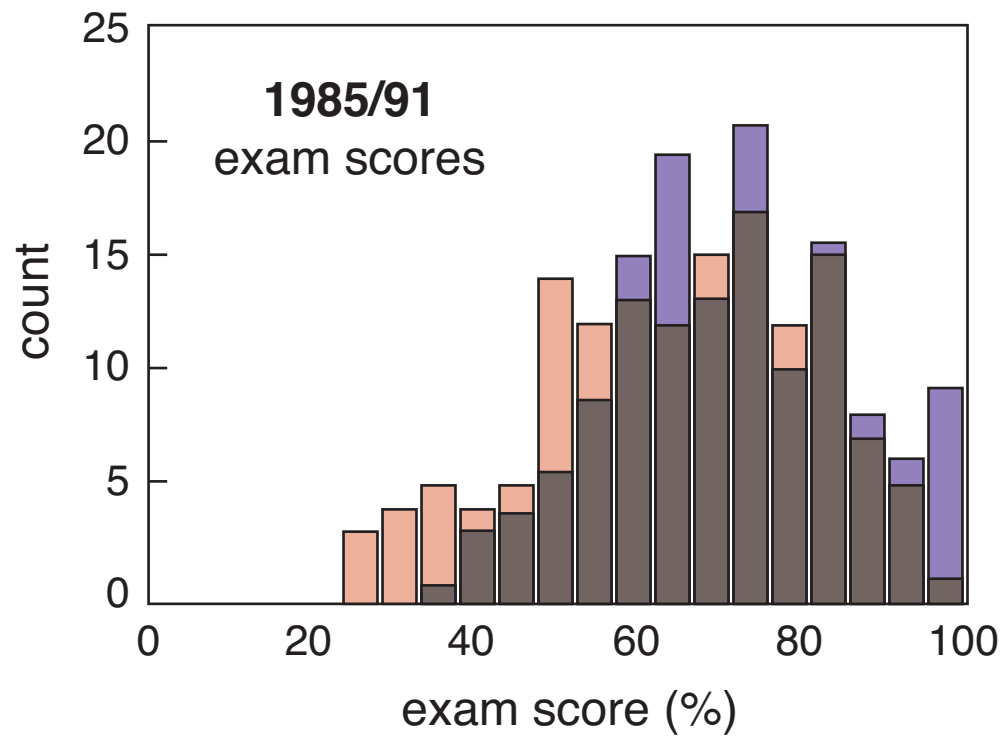




1 education

2 PI

3 test



1 education

2 PI

3 test



**So better understanding leads to better  
problem solving!**

**1** education

**2** PI

**3** test





**So better understanding leads to better problem solving!**

**(but “good” problem solving doesn’t always indicate understanding!)**

**1** education

**2** PI

**3** test





**1** education

**2** PI

**3** test



in a lecture, students...

**1** education

**2** PI

**3** test



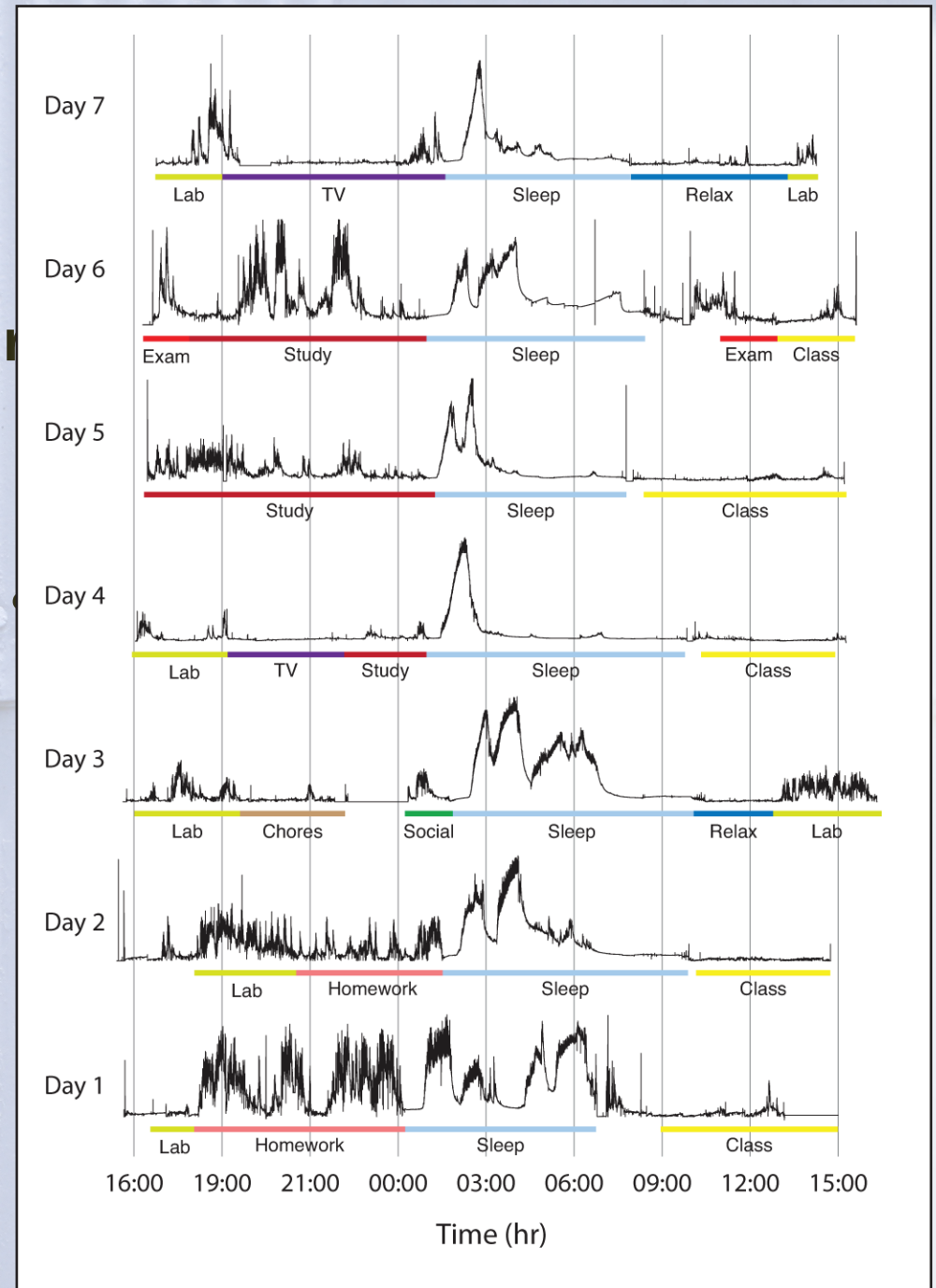
**in a lecture, students...**

**1. don't pay utmost attention**



in a lecture

1. don't pay utmost



doi: 10.1109/TBME.2009.2038487

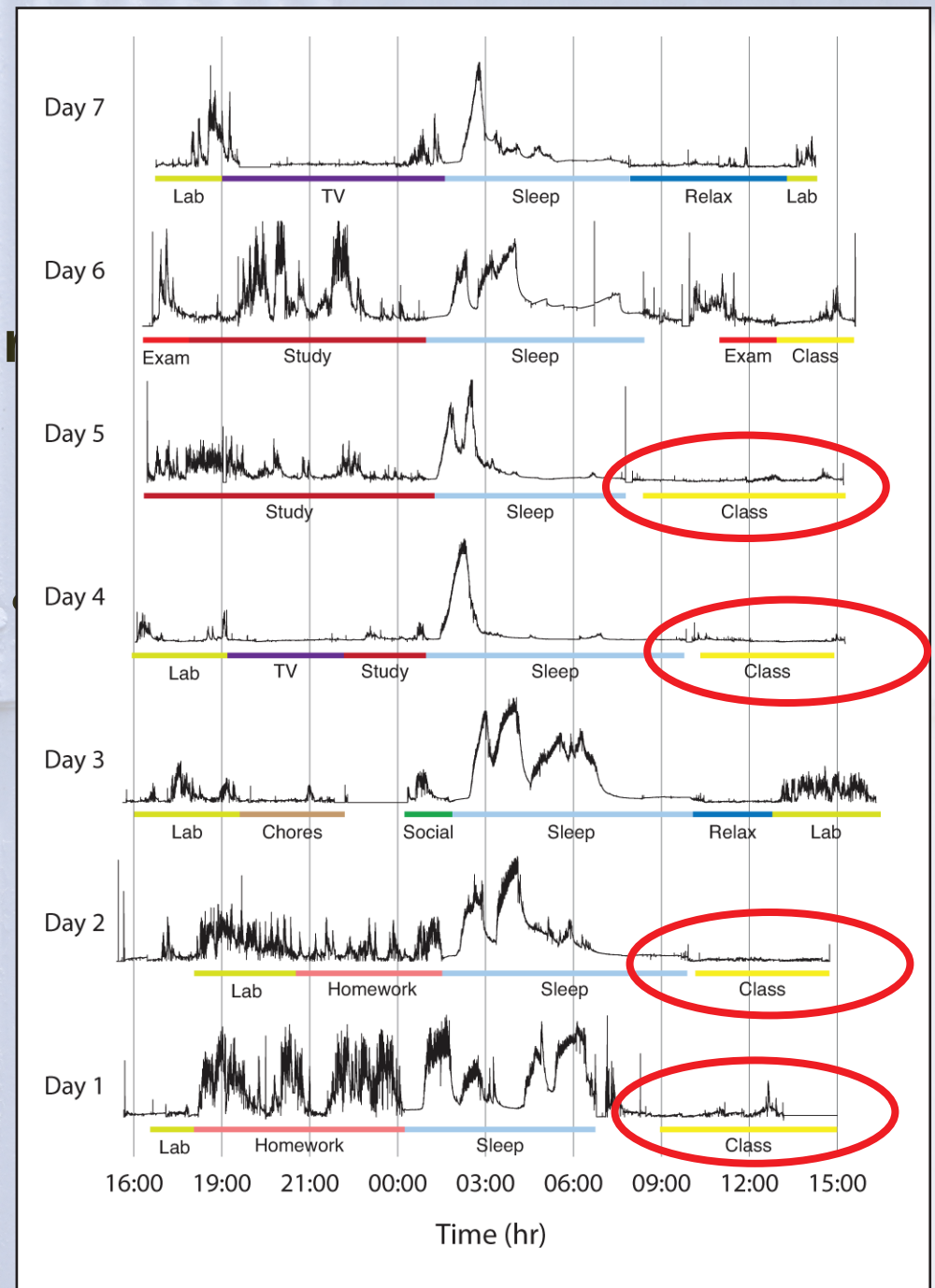
1 education

2 PI

3 test

in a lecture

1. don't pay utmost



doi: 10.1109/TBME.2009.2038487

1 education

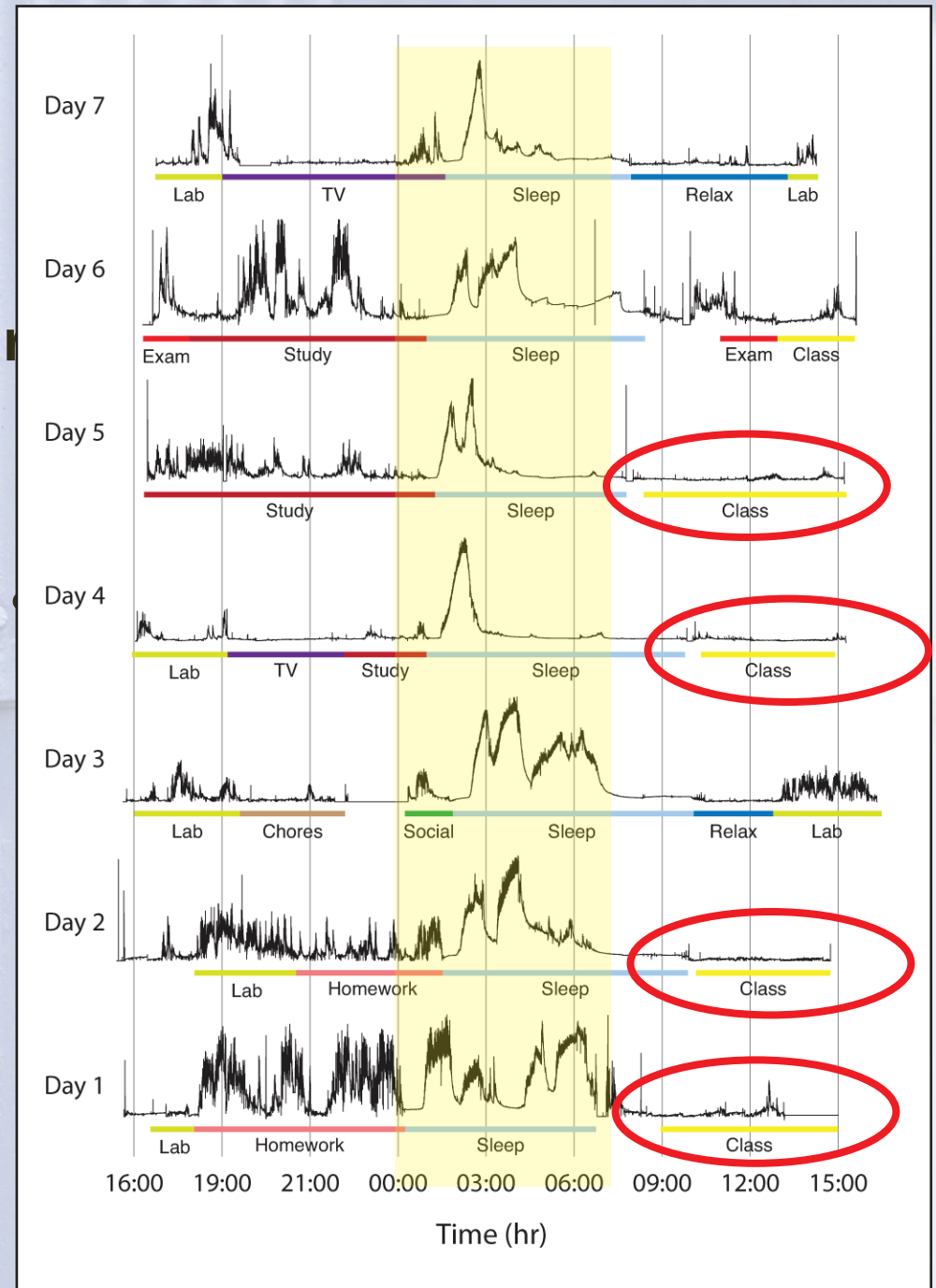
2 PI

3 test



in a lecture

1. don't pay utmost



doi: 10.1109/TBME.2009.2038487

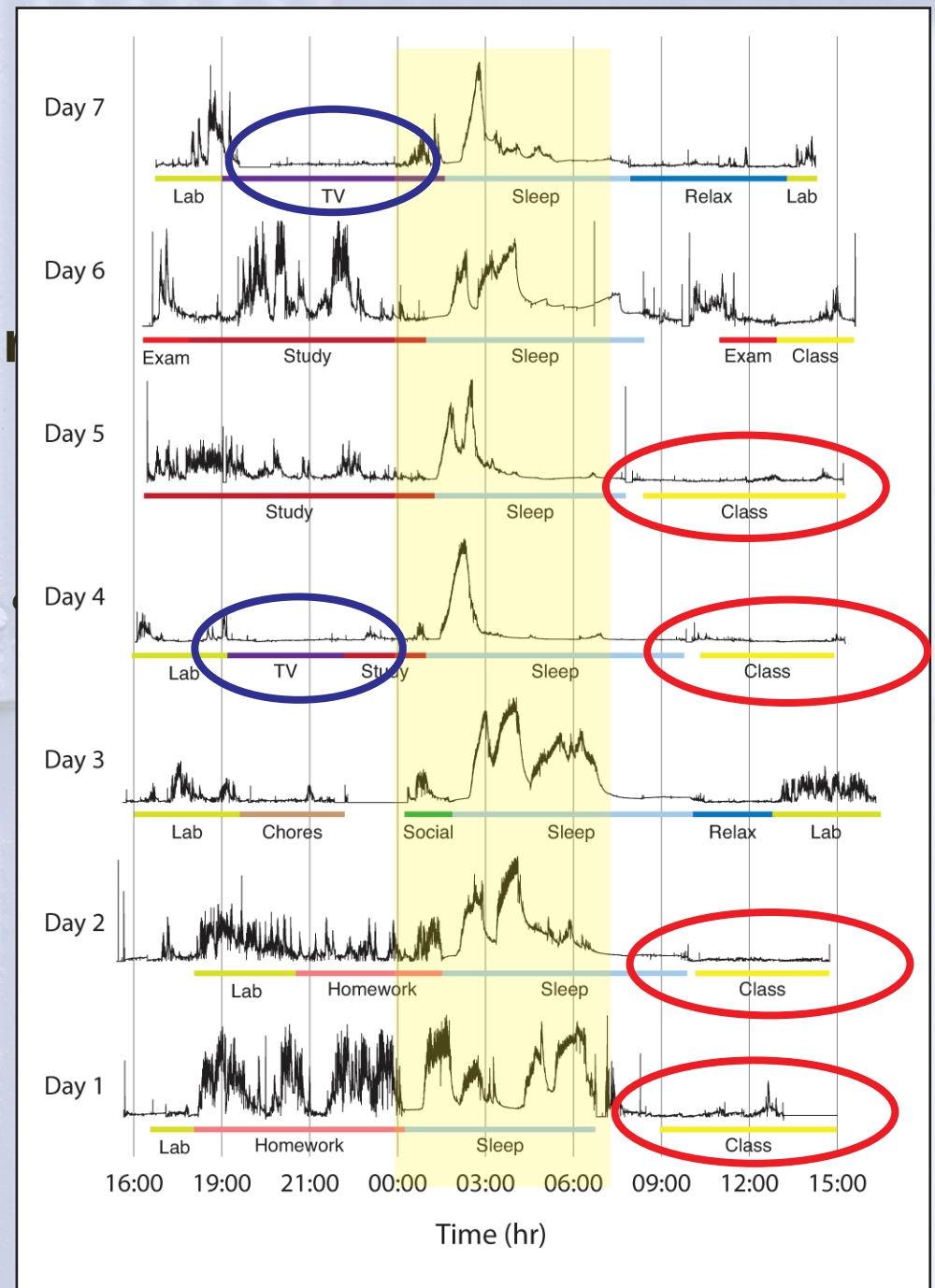
1 education

2 PI

3 test

in a lecture

1. don't pay utmost



doi: 10.1109/TBME.2009.2038487

1 education

2 PI

3 test



**in a lecture, students...**

**1. don't pay utmost attention**

**2. think they know it**



**in a lecture, students...**

- 1. don't pay utmost attention**
- 2. think they know it**
- 3. are not confronted with misconceptions**



in a lecture, students...

1. don't pay utmost attention

2. think they know it

3. are not confronted with misconceptions

false  
sense of security





**1** education

**2** PI

**3** test



The background is a faded, classical-style painting. It depicts a face, possibly a classical figure, with multiple eyes visible. The face is rendered in a pale, yellowish-tan color, and the eyes are large and detailed. The overall style is reminiscent of a classical portrait, but with a surreal twist of multiple eyes. The text 'an illusion...' is overlaid in a bold, red, serif font.

**an illusion. . .**

**1** education

**2** PI

**3** test





**Education is not just about:**

- **transferring information**
- **getting students to do what we do**



**Education is not just about:**

- **transferring information**
- **getting students to do what we do**

**active participation a must!**





**not technology, but pedagogy matters**

**1** education

**2** PI

**3** test

**Funding:**

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